



Potable Water Loss in Tennessee

May 17, 2018
TDEC-DWR-Engineering Services

Please enter data in the white cells below. Where available, metered values should be used, if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

PLEASE CHOOSE REPORTING UNITS FROM THE INSTRUCTIONS SHEET BEFORE ENTERING DATA

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

WATER SUPPLIED

<----- Enter grading in column 'E' and 'J' ----->

Master Meter and Supply Error Adjustmer

Pcnt: Value:

Volume from own sources:
 Water imported:
 Water exported:

Enter negative % or value for under-registr

Enter positive % or value for over-registrati

WATER SUPPLIED:

0.000

AUTHORIZED CONSUMPTION

Billed metered:
 Billed unmetered:
 Unbilled metered:
 Unbilled unmetered:

Click here:
 for help using option
 buttons below

Pcnt: Value:
 1.25%

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION:

0.000

Use buttons to select
 percentage of water
 supplied
 OR
 value

WATER LOSSES (Water Supplied - Authorized Consumption)

0.000

Apparent Losses

Unauthorized consumption:

0.000

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:
 Systematic data handling errors:

0.000

0.000

Apparent Losses:

0.000

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:

0.000

WATER LOSSES:

0.000

NON-REVENUE WATER

NON-REVENUE WATER:

0.000

= Water Losses + Unbilled Metered + Unbilled Unmetered



AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>

Reporting Year:

Data Validity Score: N/A*

* Confirm Units and Data Grading are Complete

Own Sources (Adjusted for known errors)

Water Losses <i>0.000</i>	Apparent Losses <i>0.000</i>	Unauthorized Consumption	<i>0.000</i>
		Customer Metering Inaccuracies	<i>0.000</i>
		Systematic Data Handling Errors	<i>0.000</i>
	Real Losses <i>0.000</i>	Leakage on Transmission and/or Distribution Mains	<i>Not broken down</i>
		Leakage and Overflows at Utility's Storage Tanks	<i>Not broken down</i>
		Leakage on Service Connections	<i>Not broken down</i>

Reporting Worksheet

American Water Works Association
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? Click to access definition
+ Click to add a comment

Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

PLEASE CHOOSE REPORTING UNITS FROM THE INSTRUCTIONS SHEET BEFORE ENTERING DATA

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

WATER SUPPLIED

<----- Enter grading in column 'E' and 'J' ----->

Master Meter and Supply Error Adjustments

Pcnt: Value:

Volume from own sources:
Water imported:
Water exported:

+	?			
+	?			
+	?			

Enter negative % or value for under-registration

WATER SUPPLIED:

AUTHORIZED CONSUMPTION

Billed metered:
Billed unmetered:
Unbilled metered:
Unbilled unmetered:

Default option selected for Unbilled unmetered - a grade

AUTHORIZED CONSUMPTION: ?

WATER LOSSES (Water Supplied - Authorized Consumption)

Apparent Losses

Unauthorized consumption:

Default option selected for unauthorized consumption - a grade

Customer metering inaccuracies:
Systematic data handling errors:

Apparent Losses: ?

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:

n/a (not applicable). Select n/a only if the entire customer population is not metered and is billed for water service on a flat or fixed rate basis. In such a case the volume entered must be zero.

1. Less than 50% of customers with volume-based billings from meter readings; flat or fixed rate billing exists for the majority of the customer population.

2. At least 50% of customers with volume-based billing from meter reads; flat rate billing for others. Manual meter reading is conducted, with less than 50% meter read success rate, remaining accounts' consumption is estimated. Limited meter records, no regular meter testing or replacement. Billing data maintained on paper records, with no auditing.

3. Conditions between 2 and 4

4. At least 75% of customers with volume-based, billing from meter reads; flat or fixed rate billing for remaining accounts. Manual meter reading is conducted with at least 50% meter read success rate; consumption for account with failed reads is estimated. Purchase records verify age of customer meters; only very limited meter accuracy testing is conducted. Customer meters are replaced only upon complete failure. Computerized billing records exist, only sporadic internal auditing conducted.

5. Conditions between 4 and 6

6. At least 90% of customers with volume-based billing from meter reads; consumption for remaining accounts is estimated. Manual customer meter reading gives at least 80% customer meter reading success rate; consumption for accounts with failed reads is estimated. Good customer meter records exist, but only limited meter accuracy testing is conducted. Regular replacement is conducted for the oldest meters. Computerized billing records exist with annual auditing of summary statistics conducted by utility personnel.

7. Conditions between 6 and 8

8. At least 97% of customers exist with volume-based billing from meter reads. At least 90% customer meter read success rate; or at least 80% read success rate with planning and budgeting for trials of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) in one or more pilot areas. Good customer meter records. Regular meter accuracy testing guides replacement of statistically significant number of meters each year. Routine auditing of computerized billing records for global and detailed statistics occurs annually by utility personnel, and is verified by a party at least once every five years.

9. Conditions between 8 and 10

10. At least 99% of customers exist with volume-based billing from meter reads. At least 95% customer meter read success rate; or minimum 80% meter reading success rate, with Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) trials underway. Statistically significant customer meter testing and replacement program in place.

VALIDITY SCORE

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 72 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Variable production cost (applied to Real Losses)

3: Unauthorized consumption

75 or lower (1/1/2017 to 12/31/2018)

80 or lower (1/1/2019 to 12/31/2020)

NON-REVENUE WATER

Performance Indicators:

Financial:	{	Non-revenue water as percent by volume of Water Supplied:	<input type="text"/>	Real Losses valued at Variable Production Cost
		Non-revenue water as percent by cost of operating system:	<input type="text"/>	
Operational Efficiency:	{	Apparent Losses per service connection per day:	<input type="text"/>	
		Real Losses per service connection per day:	<input type="text"/>	
		Real Losses per length of main per day*:	<input type="text"/>	
		Real Losses per service connection per day per meter (head) pressure:	<input type="text"/>	
From Above, Real Losses = Current Annual Real Losses (CARL):			<input type="text"/>	
? Infrastructure Leakage Index (ILI) [CARL/UARL]:			<input type="text"/>	

A water system is deemed to have excessive water loss if
Non-Revenue Water as Percent by Cost of Operating System is

20% or greater (1/1/2017 to 12/31/2020)

WATER LOSS

- Total Real Losses: 48,000,000,000 gal/year
- Cost of Real Losses: \$41,000,000/year
- Median: \$61,000/year

(based on 88% of audits submitted with self reported values)

WATER LOSS

- Total Apparent Losses: 4,000,000,000 gal/year
- Cost of Apparent Losses: \$24,000,000/year
- Median: \$27,500/year

(based on 88% of audits submitted with self reported values)

WATER LOSS



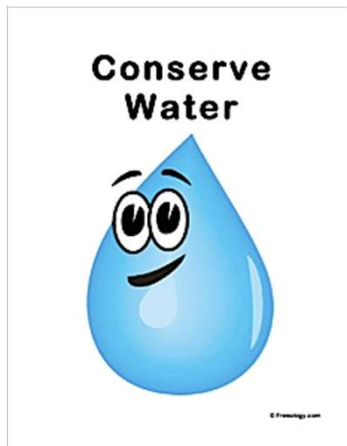
Water Loss Implications

- **Lost water** → lost revenue
- Higher operating and maintenance costs → **HIGHER RATES**
- Resource (raw water) **DEPLETION**
- WTP upgrade **LARGER AND SOONER** than necessary
- Higher vulnerability to **DROUGHT**

Water Loss Implications

Drought solutions:

REDUCTION OF WATER LOSS



CONSUMER CONSERVATION

TDEC Response



Utility Commissioner
and Municipal Official
Training



Workshops to
present best
practices

TDEC Response

- Every WTP project has to have **REASONABLE ALTERNATIVES** evaluated on a **LIFE CYCLE COST** basis
- **ARAPs** for WTPs will consider Water Loss in approval process
- CDBG **technical scores** will consider
 - MEASUREMENT
 - PLANNING



Water = Money

**If you Save Water,
you Save Money**

Questions or Ideas?

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